

APPENDIX A

List of MBSS Management Questions

LIST OF MBSS MANAGEMENT QUESTIONS

A list of questions that potentially can be answered by the MBSS is given below. An asterisk indicates a question that is addressed in the 1995-1997 report (see Section 13.1).

A. Physical Characteristics

- *1. How many wadeable stream miles of each stream order are in the study area?
- *2. What is the geographic distribution of these streams?
- *3. How many stream miles in the study area are remote?
- *4. What % of streams in the study area are estimated to be ephemeral (i.e., dry at the time of summer sampling)?
- *5. What % of stream miles are obstructed by beaver dams or other barriers?
- *6. What % of stream miles are channelized with bank revetment or artificial banks?
- *7. What % of stream miles have low bank stability?
- *8. What % of stream miles have selected types of riparian buffers?
- *9. What % of stream miles have selected widths of riparian buffers?
- *10. What % of stream miles have little shading?
- *11. What % of stream miles have high aesthetic quality?
- 12. What % of stream miles have selected types of instream habitat (e.g., riffles or pools)?
- *13. What % of stream miles have low instream habitat quality (e.g., high embeddedness)?
- *14. What % of stream miles in the study area are estimated to be publicly vs. privately owned?
- *15. What is the geographic distribution of streams with these physical characteristics across the state?
- *16. What % of stream miles have habitat conditions that differ from reference conditions as measured by indicators of stability (e.g., bank erosion) and diversity (e.g., substrate types)?
- *17. What is the relationship between the degree of aesthetic quality and remoteness?

B. Water Chemistry

- *18. What % of stream miles in the study area have low pH or ANC?
- *19. What % of stream miles have high DOC, SO_4 , or NO_3 ?
- *20. What % of stream miles have DO less than the state water quality standard?
- *21. What are the geographic distributions of streams with these water chemistry characteristics across the state?
- *22. What are the average concentrations of these water chemistry parameters in the study area (NO_3 only)?
- *23. How has the number of acidic and acid-sensitive streams (based on ANC) changed statewide since the 1987 Maryland Synoptic Stream Chemistry Survey (MSSCS)?

C. Biological Resources

- *24. What % of stream miles in the study area have no fish, nongame fish, and gamefish species?
- *25. What % of stream miles have exotic species?
- *26. What % of stream miles have rare species?
- *27. What is the geographic distribution of fish species across the state?
- *28. What is the average density (number per stream mile) of individual fish species in the study area?
- 29. What is the biomass (kg per stream mile) of individual fish species in the study area?
- 30. What is the distribution of length classes for selected gamefish species?
- *31. Which basins support the highest quality fisheries (i.e., have the greatest number of gamefish above minimum size in first to third order streams)?
- *32. What % of stream miles in the study area have fish with abnormalities (pathologies and parasites)?
- *33. What % of stream miles have fish with selected types of abnormalities?
- 34. How do fish species richness and fish community composition compare between put-and-take trout streams and unstocked streams in same basin?
- *35. What % of stream miles have selected types of herpetofauna (e.g., frogs and toads, salamanders, and reptiles)?
- *36. What is the geographic distribution of reptiles and amphibians across the state?
- 37. What is the average density (number per stream mile) of reptiles and amphibians in the study area?
- *38. Where are additional populations of rare fish and herpetofauna not previously documented located?
- *39. To what degree do the flowing, nontidal waters of the state have balanced indigenous populations of biota as measured by the fish community (e.g., What is the % of stream miles in degraded condition based on the fish Index of Biotic Integrity)
- *40. To what degree do the flowing, nontidal waters of the state have balanced indigenous populations of biota as measured by the benthic macroinvertebrate community (e.g., What is the % of stream miles in degraded condition based on EPT taxa, Hilsenhoff Biotic Index, or benthic Index of Biotic Integrity)?

D. Landscape Characteristics

- *41. What % of area (acres) in the study area is in the following land use categories: agriculture, forest, urban, and wetlands?
- *42. What is the geographic distribution of the area of these land use categories in the study area?
- 43. What % of stream miles have Superfund sites in the study area?
- 44. What % of stream miles have point sources?
- 45. What % of stream miles receive storm water discharge?
- 46. What % of watersheds in the study area have had pesticide or nutrient applications?
- 47. What % of watersheds that have been sprayed continue to have gypsy moth infestations?

- *48. Where are the minimally affected streams and what are their land use/landscape characteristics?
- 49. What are the landscape connectivity indices (shape, complexity, and dominance of patch types) for watersheds in the study area?
- 50. How have the answers to the above questions (landscape characteristics) changed between 1970 and 1990?

E. Resource-stressor Associations

- *51. What % of chronically acidic stream miles in the study area are associated with acid mine drainage (AMD) or acidic deposition as measured by pH, ANC, and SO_4 ?
- *52. What is the relationship (subpopulation analysis or correlation) between water chemistry (ANC, pH, DOC, SO_4 , NO_3 , and DO) and abundance of fish species? [pH and ANC only]
- *53. What is the relationship between stream channelization and the abundance of fish species?
- 54. What is the relationship between stream bank stability and the abundance of fish species?
- *55. What is the relationship between riparian buffer and the abundance of fish species?
- *56. What is the relationship between remoteness and abundance of fish species?
- 57. What % of stream miles in the study area with degraded biotic integrity are associated with AMD, acidic deposition, eutrophication, habitat degradation, and the presence of exotics?
- *58. What % of stream miles in the study area have suitable physical habitat and would be expected to have desired species (e.g., gamefish or endangered species) if water chemistry or other stressors were absent (i.e., are candidates for restoration)?

F. Resource-landscape associations

- *59. What is the relationship between land use and stream resources using indices of the biological community such as the IBI?
- 60. What % of stream miles in the study area with degraded biotic integrity are associated with selected land uses and land management practices?
- 61. What % of stream miles in the study area with degraded biotic integrity are associated with landscape indices such as connectivity, shape complexity, and dominance of patches?
- 62. Are changes in the % of stream miles in the study area with degraded biotic integrity associated with changes in landscape indices over the period of 1970 to 1990?
- 63. How does the quality of biota (as measured by the IBI) compare among geographic areas with selected growth strategies?
- 64. Which basins should receive priority for restoration or enhancement of fishability and nongame benefits based on future land use?